

Application No. 09/682,421  
Amendment dated  
Reply to Office Action of October 19, 2005

### **REMARKS/ARGUMENTS**

Applicant respectfully requests further examination and reconsideration in view of the arguments set forth fully below. In the Office Action mailed October 19, 2005, claims 1-72 have been rejected. In response, the applicant has submitted the following remarks. Accordingly, claims 1-72 are still pending. Favorable reconsideration is respectfully requested in view of the amended claims and the remarks below.

### **REJECTIONS UNDER 35 U.S.C. § 103**

Claims 1-6, 15-20, 29, 30-32, 34-35, 44-50, 59, 61-64 and 72 have been rejected under 35 U.S.C. § 103(a) as being anticipated by U.S. Patent No. 5,511,553 to Segalowitz (hereinafter Segalowitz) in view of U.S. Patent No. 4,026,278 to Ricketts et al (hereinafter Ricketts). The applicant respectfully disagrees with this rejection.

As recognized by the Office Action, Segalowitz does not teach one of the plurality of electrodes being attachable to the patient's back, and is configured to collect a reference signal from the patient.

Ricketts teaches an electro positioning belt having a Velcro loop fabric along the inner surface. Within the response to arguments section of the Office Action, it is stated that the Ricketts reference discloses a belt adapted to be attached around the circumference of the patient's upper torso at the desired location with the electrodes against the body. However, Ricketts does not teach the electrode being configured to collect a reference signal from the patient, thus constructing a precordial central terminal so that precordial ECG leads can be computed without limit electrodes. Therefore, the applicant respectfully submits that Ricketts does not teach an electrode positioned on the patient's back, and configured to collect a reference signal from the patient.

In contrast to the teachings of Segalowitz, Ricketts, and their combination, the method and apparatus for generating electrocardiogram precordial leads using a precordial central terminal of the present invention includes at least one electrode attached to the patient's back and configured to receive a reference signal. As described above, Segalowitz

and Ricketts do not teach a device for acquiring and processing signals including a plurality of electrodes for attachment to the patient's torso, wherein at least one of the plurality of electrodes is attachable to the patient's back, and is **configured to collect a reference signal** from the patient. The present invention utilizes the electrode on the patient's back to collect a reference signal in order to construct a precordial central terminal so that precordial ECG leads can be computed without limb electrodes. Ricketts does not teach an electrode with such capability.

The independent claim 1 is directed to a device for acquiring and processing electrical signals produced by a patient's heart comprising a plurality of electrodes for attachment to the patient's upper torso, wherein the plurality of electrodes does not include electrodes for attachments to the patient's limbs, an acquisition module coupled to the plurality of electrodes for acquiring electrical signals from the plurality of electrodes and a signal processor coupled to the acquisition module for generating a plurality of electrocardiogram precordial leads from the acquired signals, wherein at least one of the plurality of electrodes is attachable to the patient's back, and is configured to collect a reference signal from the patient. As described above, neither Segalowitz, Ricketts, nor their combination, teach a device for acquiring and processing signals including a plurality of electrodes for attachment to the patient's torso, wherein at least one of the plurality of electrodes is attachable to the patient's back, and is **configured to collect a reference signal** from the patient.

Claims 2-6 are all dependent upon the independent claim 1. As discussed above, the independent claim 1 is allowable over the teachings of Segalowitz, Ricketts, and their combination. Accordingly, claims 2-6 are also allowable as being dependent upon an allowable base claim.

The independent claim 16 is directed to an electrocardiogram device for acquiring and processing electrical signals produced by a patient's heart comprising a belt adapted to be attached to the patient's upper torso, a plurality of electrodes coupled to the belt, wherein the plurality of electrodes does not include electrodes for attachments to the

patient's limbs, an acquisition module coupled to the belt and the plurality of electrodes for acquiring electrical signals from the plurality of electrodes, a signal processor coupled to the acquisition module for generating a plurality of electrocardiogram precordial leads from the acquired electrical signals, a transmitter coupled to the acquisition module for transmitting the plurality of electrocardiogram precordial leads and a receiver wirelessly coupled to the transmitter for receiving the acquired electrical signals, wherein at least one of the plurality of electrodes is attachable to the patient's back, and is configured to collect a reference signal from the patient. As described above, neither Segalowitz, Ricketts nor their combination teach a device for acquiring and processing signals including a plurality of electrodes for attachment to the patient's torso, wherein at least one of the plurality of electrodes is attachable to the patient's back, and is **configured to collect a reference signal** from the patient. For at least these reasons, the independent claim 16 is allowable over the teachings of Segalowitz, Ricketts and their combination.

Claims 17-20 and 29 are all dependent upon independent claim 16. As discussed above, independent claim 16 is allowable over the teachings of Segalowitz, Ricketts and their combination. Accordingly, claims 17-20 and 29 are also allowable being dependent upon an allowable base claim.

The independent claim 30 is directed to an acquisition device for attachment to a patient and for acquiring electrical signals produced by the patient's heart comprising a belt adapted to be attached to the patient's upper torso, a plurality of electrodes coupled to the belt, the plurality of electrodes including at least one electrode position within the belt so that when the belt is attached to the patient, the electrode contacts that patient's chest, and at least one electrode positioned within the belt so that when the belt is attached to the patient the electrode contacts the patient's back, wherein the plurality of electrodes does not include electrodes for attachment to the patient's limbs, wherein the at least one electrode positioned on the patient's back is configured to collect a reference signal from the patient, an acquisition module including a signal processor coupled to the belt and the plurality of electrodes for acquiring electrical signals from the plurality of electrodes and for

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generating a plurality of electrocardiogram precordial leads from the acquired signals and a transmitter coupled to the acquisition module for transmitting the plurality of the electrocardiogram precordial leads to a remote location. As described above, neither Segalowitz, Ricketts nor their combination teach the feature of a device for acquiring and processing signals including a plurality of electrodes for attachment to the patient's torso, wherein at least one of the plurality of electrodes is attachable to the patient's back, and is configured to **collect a reference signal** from the patient. For at least these reasons, the independent claim 30 is allowable over the teachings of Segalowitz, Ricketts and their combination.

Claims 31-32, 34-35 and 44 are all dependent upon the independent claim 30. As discussed above, the independent claim 30 is allowable over the teachings of Segalowitz, Ricketts and their combination. Accordingly, claims 31-32, 34-35 and 44 are all allowable as being dependent upon an allowable base claim.

The independent claim 45 is directed to a method of acquiring and processing electrical signals produced by a patient's heart comprising positioning a plurality of electrodes on the patient's upper torso, without positioning electrodes on the patient's limbs, acquiring electrical signals from a plurality of electrodes with an acquisition device and generating a plurality of electrocardiogram precordial leads from the acquired electrical signals, wherein at least one of the plurality of electrodes is attachable to the patient's back, and is configured to collect a reference signal from the patient. As described above, neither Segalowitz, Ricketts, nor their combination, teach a device for acquiring and processing signals including a plurality of electrodes for attachment to the patient's torso, wherein at least one of the plurality of electrodes is attachable to the patient's back, and is configured to **collect a reference signal** from the patient. For at least these reasons, the independent claim 45 is allowable over teachings of Segalowitz.

Claims 46-50 and 59 are all dependent upon the independent claim 45. As discussed above, the independent claim 45 is allowable over the teachings of Segalowitz,

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Ricketts, and their combination. Accordingly, claims 46-50 and 59 are also allowable as dependent upon an allowable base claim.

Claims 61-64 and 72 are all dependent upon the independent claim 60. As will be discussed below, the independent claim 60 is allowable over the teachings of Ricketts, Segalowitz, and U.S. Patent No. 6,389,308 to Shusterman (hereinafter Shusterman). Accordingly, claims 61-64 and 72 are also allowable as being dependent upon an allowable base claim.

Claim 7, 14, 21, 28, 36, 43, 51 and 58 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over Segalowitz and Ricketts as applied to claims 1, 5, 16, 19, 30, 34, 45 and 49 above and further in view of Shusterman. Claims 7, 14, 21, 28, 36, 43, 51 and 58 are dependent upon the independent claims 1, 16, 30 and 45. As discussed above, the independent claims 1, 16, 30 and 45 are allowable over the teachings of Segalowitz, Ricketts, and their combination. Accordingly, claims 7, 14, 21, 28, 36, 43, 51 and 58 are all allowable as being dependent upon an allowable base claim.

Claims 8, 11-12, 22, 25-26, 37, 40-41, 52, 55 and 56 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over Segalowitz and Ricketts as applied to claims 1, 16, 30 and 45 above, and further in view of GE Medical Systems Information Technologies, ACI-TIPT Standard 12/15-Lead Placement. Claims 8, 11-12, 22, 25-26, 37, 40-41, 52, 55 and 56 depend upon the independent claims 1, 16, 30 and 45. As discussed above, the independent claims 1, 16, 30 and 45 are allowable over the teachings of Segalowitz, Ricketts, and their combination. Accordingly, claims 8, 11-12, 22, 25-26, 37, 40-41, 52, 55 and 56 are also allowable as being dependant upon an allowable base claim.

Claims 9, 23, 38 and 53 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over Segalowitz, Ricketts and GE Medical Systems Information Technologies as applied to claims 8, 22, 37 and 52 and further in view of Shusterman. Claims 9, 23, 38 and 53 are dependent upon the independent claims 1, 16, 30 and 45. As discussed above, the independent claims 1, 16, 30 and 45 are allowable over the teachings of Segalowitz,

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Ricketts, and their combination. Accordingly, claims 9, 23, 38 and 53 are allowable as being dependent upon an allowable base claim.

Claims 10, 24, 39 and 54 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over Segalowitz, Ricketts, GE Medical Systems Information Technologies and Shusterman as applied to claims 9, 23, 38 and 53 above, and further in view of U.S. Patent No. 5,615,687 to Pritchard (hereinafter Pritchard). Claims 10, 24, 39 and 54 are dependent upon the independent claims 1, 16, 30 and 45. As discussed above, the independent claims 1, 16, 30 and 45 are allowable over the teachings of Segalowitz, Ricketts, and their combination. Accordingly, claims 10, 24, 39 and 54 are allowable as being dependent upon an allowable base claim.

Claims 13, 27, 42 and 57 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over Segalowitz, Ricketts and GE Medical Systems Information Technologies as applied to claims 12, 26, 41 and 56, and further in view of Pritchard. Claims 13, 27, 42 and 57 are dependant upon the independent claims 1, 16, 30 and 45. As discussed above, the independent claims 1, 16, 30 and 45 are allowable over the teachings of Segalowitz, Ricketts, and their combination. Accordingly, claims 13, 27, 42 and 57 are allowable as dependant upon an allowable base claim.

Within the Office Action, claims 60 and 71 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over Ricketts in view of Segalowitz and Shusterman. The independent claim 60 is directed to a method of acquiring and processing electrical signals produced by a patient's heart comprising positioning a plurality of electrodes on the patient's upper torso, the plurality of electrodes including at least one electrode positionable on the patient's chest and at least one electrode positionable on the patient's back, wherein the plurality of electrodes does not include electrodes for positioning on the patient's limbs, wherein the at least one electrode positioned on the patient's back is configured to collect a reference signal from the patient, acquiring electrical signals from the plurality of electrodes with an acquisition module, generating an approximation of an electrical potential near the center of the patient's heart by determining a weighted combination of a plurality of

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the acquired electric signals and generating a plurality of electrocardiogram precordial leads from the acquired electrical signals by subtracting the approximation of the electrical potential near the center of the patient's heart from each one of the signals acquired from the at least one electrode on the patient's chest. As described above, neither Ricketts, Segalowitz nor Shusterman nor their combination teach a device for acquiring and processing signals including a plurality of electrodes for attachment to the patient's torso, wherein at least one of the plurality of electrodes is attachable to the patient's back, and is **configured to collect a reference signal** from the patient. For at least these reasons, the independent claim 60 is allowable over the teachings of Ricketts, Segalowitz, Shusterman and their combination.

Claim 71 is dependent upon the independent claim 60. As discussed above, the independent claim 60 is allowable over the teachings of Ricketts, Segalowitz, Shusterman and their combination. Accordingly, claim 71 is also allowable as being dependent upon an allowable base claim.

Claims 65-66 and 68-69 have been rejected under 35 §103(a) as being unpatentable over Ricketts, Segalowitz, and Shusterman as applied to claim 60 above, and further in view of GE Medical Systems Information Technologies. Claims 65-66 and 68-69 are dependent upon the independent claim 60. As discussed above, the independent claim 60 is allowable over the teachings of Ricketts, Segalowitz, Shusterman, and their combination. Accordingly, claims 65-66 and 68-69 are allowable as being dependent upon the allowable base.

Claim 67 has been rejected under 35 USC §103(a) as being unpatentable over Ricketts, Segalowitz, Shusterman and GE Medical Systems Information Technologies as applied to claim 66 above, and further in view of Pritchard. Claim 67 is dependent upon the independent claim 60. As discussed above, the independent claim 60 is allowable over the teachings of Ricketts, Segalowitz, Shusterman, and their combination. Accordingly, claim 67 is also allowable as being dependent upon an allowable base claim.

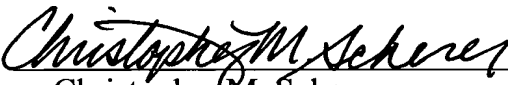
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Claim 70 has been rejected under 35 USC §103(a) as being unpatentable over Ricketts, Segalowitz, and Shusterman, as applied to claim 69 above and further in view of Pritchard. Claim 70 is dependent upon the independent claim 60. As discussed above, the independent claim 60 is allowable over the teachings of Ricketts, Segalowitz, Shusterman, and their combination. Accordingly, claim 70 is also allowable as being dependent an allowable base claim.

For the reasons given above, applicant respectfully submits that that the claims are now in a condition for allowance, an allowance at an early date would be appreciated. Should the Examiner have any questions or comments, they are encouraged to call the undersigned at 414-271-7590 to discuss the same so that any outstanding issues can be expeditiously resolved.

Respectfully submitted,

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